



Retention, Tenure, and Promotion



Dr. Jamie Sherman

Assistant Professors Jamie Sherman and Jessica Rupp successfully completed their 3rd year retention reviews. Dr. Sherman teaches BIOB 375, General Genetics, and PSPP 542, Genetics of Plant Improvement, and has built a strong foundation for her barley breeding and genetics program consisting of extramural funding, graduate students, and MSU's (and the region's) first malt quality lab.



Dr. Li Huang and Dr. Alan Dyer

Dr. Dyer's research focuses primarily on community ecology and evolution of root pathogens and he teaches BIOM 421, Concepts of Plant Pathology. Since starting at MSU, Dr. Dyer has published 14 peer-reviewed journal articles along with 27 extension related publications and consistently brings in extramural funding to support his lab. Clearly, Dr. Dyer is highly motivated to conduct research relevant to Montana growers and to make sure the results are utilized.

Dr. Huang's research focuses primarily on the genetics and molecular mechanisms of wheat-rust pathogen interactions and she teaches BIOM 465/PSPP 565 Plant-Pathogen Interaction and has also taught BIOB 375, General Genetics. Dr. Huang has published 12 journal articles since being promoted with tenure and has obtained funding from the NSF to support her basic research and her international collaborations. Dr. Dyer and Dr. Huang's



Dr. Jessica Rupp

Dr. Rupp has an extension and research appointment and has participated in or led over 40 off-campus extension programs focusing on seed potato, sugarbeet, and pulse crop diseases. She has also built a strong foundation for her research program with extramural funding, graduate students and a diverse array of research projects.

Congratulations Dr. Sherman and Dr. Rupp!

Associate Professors Alan Dyer and Li Huang successfully completed their promotion reviews with the final positive review being that of President Cruzado who will forward her recommendation to the Board of Regents that each be promoted to the level of Professor.

record of publication and grants demonstrate excellence in research. Congratulations Dr. Dyer and Dr. Huang!

PSPP Graduates!



On May 4, the Plant Sciences and Plant Pathology Department will hold an awards ceremony and reception for our graduates in 108 PBB/Mathre Courtyard. The graduates will receive the following gifts: Landscape Design graduates - "Toward an Urban Ecology: SCAPE"; Crop Science and Plant Biotechnology graduates - "Endurance: Shackleton's Incredible Voyage"; Sustainable Crop Production graduates - "The Artful Garden"; Plant Biology graduates - "Medicinal Plant of the Mountain West" and "Natural Product Medicine"; Horticulture Science graduates will receive loupes (magnifying glass). All the graduates will receive a cowbell and MSU tassel bead from the College of Agriculture, as well as a coffee mug or water bottle and geranium from the Department.

Following are the names of all those that will receive diplomas and awards.

Graduate Students

Niranjana Aryal - Ph.D., Plant Sciences
Megan Getz - M.S., Plant Sciences
Paula Guastello - M.S., Plant Sciences
Joseph Kibiwott - M.S., Plant Sciences

Undergraduates

Environmental Horticulture - Horticulture Science

Sparks Anderson - B.S.
Zachary Jones - B.S., Honors
Quint Long - B.S.
Quentin Lorenzo - B.S.
Nicholas Townsend - B.S.

Environmental Horticulture - Landscape Design

Amy Costle - B.S.
Andrew Davis - B.S.
Brandon Hudyma - B.S.
Marisa White - BS, Honors, Minor in Horticulture Science

Plant Sciences - Crop Sciences

Samuel Ackerman - B.S.
Lucas Ahlman - B.S.
Kelly Bronec - B.S.
Evan Crittenden - B.S., Honors
Tayber Goff - B.S.
Tyler Maszk - B.S.
Morgan Miller - B.S., Honors
Spencer Smelser - B.S.
Tyler Zinne - B.S.

Plant Sciences - Plant Biology

Samantha Severyn - B.S.

Plant Sciences - Plant Biotechnology

Joseph Jensen - B.S., Honors
Aishwarya Shekhar Kothari - B.S., Honors

Sustainable Food & Bioenergy Systems - Sustainable Crop Production

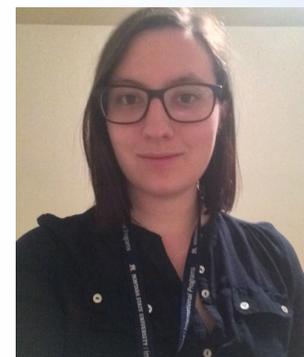
Melissa Soddy - B.S.

Congratulations to each of you and we wish you all the best in your future endeavors!

Graduate Scholarship Winners

Scholarships from the Montana Grain Growers Association and the Montana Grains Foundation for the 2018-2019 school year were awarded to PSPP PhD students Eleanor Brant and Uta Stuhr.

Eleanor Brant is a Plant Genetics PhD



candidate working in the MSU-Bozeman Cereal Genomics Lab who "aspires to become proficient within the field of molecular plant genetics, with a particular focus on crop species."

Her essay further states: "I am enthusiastic about the prospect of continuing to develop the CRISPR technology and explore its possible uses in both genetic and epigenetic contexts."

Uta Stuhr received the MGF scholarship funded by CoBank. She is a PhD candidate



in Plant Pathology studying wheat streak mosaic disease by conducting research trials across the state. One of her project objectives is to develop a risk assessment tool,

AWaRe (Assessment of Wheat streak mosaic Risk). Born and educated in Germany, Uta has discovered a “sense of home and belonging” in Montana and feels “called to dedicate my efforts to Montana’s agriculture and supporting its agricultural community.”

Nyamesorto Wins (BGRI) Graduate Student Competition



Bernard Nyamesorto receives BGRI Award.

Bernard Nyamesorto, a PhD student in the Huang lab, recently won the graduate research competition at the recently organized Borlaug Global Rust Initiative (BGRI) technical workshop. His abstract “Development of new rust resistant germplasm via

modifications of wheat MYC4 transcription factors”, stood out among the many submitted to be presented at a plenary session of the workshop. This award scheme was set up by the BGRI community to recognize, honor, and motivate graduate students who are undertaking groundbreaking research vital to combating rust diseases in wheat.

The BGRI, chaired by Jeanie Borlaug Laube, is a global consortium of scientists from around the world who are actively carrying out Dr. Normal Borlaug’s mission to combat the rust diseases of wheat. With the



Dr Li Huang, second from left and Dr. Robert McIntosh, third from left, along with Bernard, second from right.

support of the Bill & Melinda Gates Foundation and the UK Department for International Development, the BGRI mission has now expanded to include other wheat diseases and abiotic stresses such as heat and drought. The 2018 BGRI Technical Workshop held in Marrakesh, Morocco, 14-17 April 2018, had 333 participants from 51 countries and focused on the efforts of wheat scientists to secure the world’s wheat crop and manage disease vulnerability. The workshop brought together scientists, policymakers, and representatives of leading agricultural research-for-development organizations, both public and private. The International Center for Agricultural Research in the Dry Areas (ICARDA) served as the local host.

Bernard is barely a year and a half into his PhD program studies under the supervision of Dr. Li Huang. His research is in plant host-pathogen interaction with the focus on creating rust resistant germplasms through the identification and modification of bread wheat (*Triticum aestivum* L) genes involved in wheat rust fungal pathogenicity. He said this award is a big motivation for his research career and PhD program and he dedicates this award to Dr. Li Huang & the Huang lab, MSU, and his family back in Ghana.

Grass Roots and Grass Tops

By Florence Dunkel

For the final class of the University core course in research, AGSC 465R Health, Poverty, Agriculture, students invited their families, friends, and other professors as well as the university community to view their research presentations. Students answered questions prompted by their posters while offering food and drink typical to the specific indigenous farming/ranching community where they had chosen to focus their research.

An Honor Song from Chontal Mitchell Standing Rock, a citizen of the Chippewa-Cree Nation and MSU student, helped us center our thoughts for the serious formal presentations of these students. Dr. Marilyn Lockhart, Director of the MSU Center for Teaching Excellence, welcomed us. AGSC 465R co-instructor, Dr. Hiram Larew, brought our attention to the "grass tops", a topic he introduced us to weekly during the semester. With his guidance, students poured over the 2014 Farm Bill, considered documents urging changes in Research, Nutrition, and Trade, and wrote letters to their congressmen and women.

What was new? Nathaniel Sisson, student in Cell Biology and Neuroscience, pointed out how effective crowd funding and interaction with the news media can be. As the semester began, farmer women in Sanambele, Mali, had only a dream of eliminating kwashiorkor (stunting) in their children with their own chicken coop near the village. This week, thanks to Nathaniel's innovative approach, women began making the bricks for the building, their in-kind matching contribution. Meanwhile Karl Tolgu, Hispanic Studies major, gathered ideas for how to help other village women avert the risks (the return of acutely fatal cerebral malaria) and still grow irrigated rice. A decade ago, AGSC 465R students helped these villagers successfully implement local elimination of cerebral malaria.

Two new-to-the course, but millennia-old, farming communities in Europe were added to



Kelsey Peterson, Sustainable Foods and Bio-energy Systems major, paused with Dunkel at the reception to consider next steps in response to Northern Cheyenne Elder, Linwood Tall bull's request to expand www.nc-plantlore.org website created by former AGSC 465R and Horticulture major, Alisha Bretzman with "campfire" stories provided to Kelsey this semester.



Dr. Mac Burgess discusses Apsaalooke land management ideas with Zach and his father, Gallatin Gateway ranchers.

the course. Cropping systems senior, Lucas Ahlman, added his own village in Villavallelonga, Italy (Abruzzo region). Thanks to a recent Office of International Programs Faculty Enhancement grant to Dunkel, she added her own Indigenous village, Aragona, Sicily. Claire Zahner, a Plant Biotech major, used her skills in genetics to help us all understand the significance of Traditional Ecological Knowledge (TEK) retained during emigration.

Two other Crop Systems majors, Zach Huyser and Sam Ackerman, worked with Elders and other citizens of the Northern Cheyenne and Apsaalooke Nations in Montana. These two seniors gained insights likely changing their approach to land management and crop advising, something they will be doing full time after graduation.

In addition to learning how peer-refereed journal articles are created and their significance in the process of doing Western Science, each student demonstrated what TEK is and how it affects their own community of focus. Students completed CITI training and completed IRB requests. They also wrote an in-depth research paper in journal format. Mentored reflective journaling, required for service-learning such as this helped students wrap their minds around Dunkel's 10 basic concepts of culture-smart agriculture. Four TAs who each grew up in four non Euro-American cultures lent their perspectives more than weekly. These were recent Cropping Systems graduate, Titus Hendricks, who grew up in rural Kenya, the graduate students: Badmaa Dovchin (LRES Ph.D. student) from a herding community in Mongolia; Avery Old Coyote (Native American Studies M.S. student) citizen of the Apsaalooke Nation; and Burcu Alptekin (PSPP Ph.D. student) from Istanbul, Turkey.

The Voice of Montana Farmers By Hikmet Budak

As an initiative of the Cereal Genomics & Targeted Breeding Program from the Department of Plant Science and Plant Pathology, the 2nd workshop of "The Voice of Montana Farmers" was held on Friday April 13, 2018, at 1:30 PM at the Plant Bioscience Building. The workshop started with a University update on Research at Montana State University by Dr. Renee Reijo, Vice President of Research and Economic Development at MSU and Dr. Charles Boyer, Dean of College of Agriculture. The speaker of the 2nd



Dr. Reijo providing an update on Research at Montana State University at the 2nd workshop of "The Voice of Montana Farmers".



Mr. Edwards gave a talk at the 2nd workshop of "The Voice of Montana Farmers".

workshop was Mr. Lochiel Edwards, a third generation wheat farmer located near Big Sandy, Montana. Mr. Edwards covered a broad range of topics related to agriculture in Montana including subsidies in agriculture, railroad freight and marketing of cereal commodities, and the different roles and contributions of a number of different organizations associated with cereal production and marketing in Montana. This 2nd workshop was well attended with an audience made up of farmers from around Montana and faculty, staff, and graduate students from MSU.

2018 Field Days

Southern Agricultural Research Center,
Tuesday, June 19: The field day begins at 3 p.m. and includes dinner. The center is located at 748 Railroad Highway in Huntley. 406-348-3400.

Northern Agricultural Research Center,
Thursday, June 21: The field day begins at 3 p.m. with tours before and after dinner. The center is located about seven miles southwest of Havre on U.S. Highway 87. 406-265-6115.

Western Triangle Agricultural Research Center, Tuesday, June 26: The field day begins at 11:30 a.m. and will include lunch. The center is located at 9546 Old Shelby Road in Conrad. 406-278-7707.

Northwestern Agricultural Research Center, Tuesday, July 10: The field day begins at 2 p.m., with dinner following the tour. NWARC is located near Creston on State Highway 35. 406- 755-4303.

Central Agricultural Research Center, Thursday, July 12: Registration begins at 8:30 a.m. with coffee and doughnuts. The field day starts at 9 a.m. and includes lunch. The center is located 2.5 miles west of Moccasin on U.S. Highway 87. 406-423-5421.

The MSU Arthur H. Post Agronomy Farm, Friday, July 13: The Post Farm will begin tours at 8:30 a.m. followed by lunch. The Post Farm is located eight miles west of Bozeman on U.S. Highway 191. 406-586-6819.

Eastern Agricultural Research Center, Tuesday, July 17: The field day begins at 9 a.m. and will include lunch. The center is located one mile north of Sidney on State Highway 200. 406-433-2208.

Western Agricultural Research Center, Thursday, July 26: The field day starts at 4:30 p.m. with dinner at 5 p.m. and tours following. WARC is located at 580 Quast Lane, Corvallis. 406-961-3025.

Montana Ag Live May Schedule

5/6 Michelle Flenniken, MSU research scientist, will discuss methods used to make Montana's honey bee population healthier and also look at the importance of bees in production agriculture.

5/13 Pat Carr, Agronomist at MSU's Central Ag Research Center at Moccasin, looks at incorporating traditional warm season crops into Montana's traditional cool season cropping systems.

5/20 Joe Janzen, MSU Ag Economist, will field questions on how NAFTA (North American Free Trade Agreement) affects Montana's agricultural community.

Grants

Cathy Cripps and Chance Noffsinger; John W. Marr Fund provided through the University of Colorado Boulder. This grant will allow Chance to spend a week in Colorado looking for alpine mushroom collections for his research.

Publications

Naimat Ullah, Meral Yuce, Z. Neslihan Ozturk Gokce, and Hikmet Budak., "Comparative metabolite profiling of drought stress in roots and leaves of seven Triticeae species", BMC GENOMICS

Alexander J. McMenamin, Michelle L. Flenniken, "Recently identified bee viruses and their impact on bee pollinators", Current Opinion in Insect Science

Burns E. E., E. A. Lehnhoff, B. K. Keith, F. D. Menalled, and W. E. Dyer. 2017. Impacts of Environmental and Biological Stressors on the Population Dynamics of Multiple Herbicide Resistant Avena fatua (L.). Global Herbicide Resistance Challenge 2017 Proceedings.

Keith, B.K., E.A. Burns, C. Carey, and W.E. Dyer. 2017. RNA-seq transcriptome analysis of multiple herbicide resistance in Avena fatua L. Global Herbicide Resistance Challenge 2017 Proceedings.

Dyer, W.E., B.K. Keith, EA Burns, C Carey, B Bothner, A Mazurie, and JK Hillmer. 2017. Molecular, proteome, and biochemical characterization of multiple herbicide-resistant *Avena fatua* accessions. Global Herbicide Resistance Challenge 2017 Proceedings.

Hussain B, Lucas SJ, Budak H (2018). CRISPR/Cas9 in plants: at play in the genome and at work for crop improvement *Briefings in Functional Genomics*, ely016, <https://doi.org/10.1093/bfpg/ely016>

HORT 232 Final By Toby Day

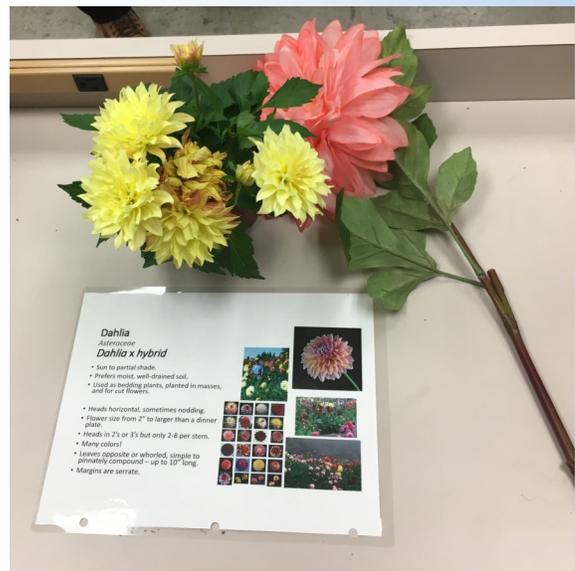
Today was the final for the Horticulture 232 Herbaceous Identification class at the PGC. Thirty students spent hours studying for the final which consisted naming and correctly spelling the common and scientific names of 50 annuals, perennials, ornamental bulbs and houseplants. The students learned over 160 plants in total, which is compiled from a list of common plants found in the garden center, landscaping and nursery industry. This year's students were exceptional! Congratulations!



Cecilia Abell studying for the final.



Students learn over 160 herbaceous plants common to most garden centers.



Each plant is labelled with the common and scientific names plants, as well as cultural and identification information that the students are required to know.

Call 811 Before You Dig! By Toby Day, Horticulture Extension Specialist

If you are planning on putting in a garden, trenching lines for an irrigation project, planting trees in the boulevard, or breaking ground on a new fire pit, it is very important that you call 811 to locate the utilities in the area where you are digging. There are often gas, power, water and other utility lines that can be buried just below the surface that can cause damage to property, underground utilities, but more important, can hurt or even kill you.

A punctured gas line can erupt and catch fire, an electric wire that is cut can electrocute you and a water line that is broken sure can cause a mess! Take it from me, I've had my share of close calls. When I worked in the landscape industry, one of my crew members hit a 2" natural gas line with a backhoe. The line was required to be buried at least 36" deep. Yet, we were digging only a foot into the ground when it was hit. The result is that pressurized natural gas left the pipe with such force that it sounded like a jet engine. Luckily it never caught fire and was capped before it did any damage. Had it caught fire, I think it would have damaged every house on the block.

Another incident occurred when I purchased my first house. I decided to put in a paver sidewalk along the side of the house. The project required me to dig down 6" for the sand and the pavers. At one point I thought I had struck a rock. I had hit the area several times with the point of the shovel to see how large the object might be. After taking a rest, I noticed that the power line was attached to the house where I was digging. And, unlike anything I had seen before, it was buried underground – and only buried 6" deep! This wasn't nearly deep enough for code, and something I would have never thought would be an obstacle in the area. Had I hit that power line, I wouldn't be writing this article today. I was very lucky.

So, make the call. Utilities often aren't buried as deep as they are supposed to be. It's easy, and its free – Call 811 before you start any project this year where you must dig into the ground.



Recipe of the Month

Bacon Ranch Pasta Salad - very good!

- 1 (12 ounce) package uncooked tri-color rotini pasta
- 10 slices bacon

- 1 cup mayonnaise
 - 3 tablespoons dry ranch salad dressing mix
 - 1/4 teaspoon garlic powder
 - 1/2 teaspoon garlic pepper or just pepper
 - 1/2 cup milk, or as needed
 - 1 large tomato, chopped
 - 1 (4.25 ounce) can sliced black olives
 - 1 cup shredded sharp Cheddar cheese
- Bring a large pot of lightly salted water to a boil; cook rotini at a boil until tender yet firm to the bite, about 8 minutes; drain.



Place bacon in a skillet over medium-high heat and cook until evenly brown. Drain and chop.

In a large bowl, mix mayonnaise, ranch dressing mix, garlic powder, and garlic pepper. Stir in milk until smooth. Place rotini, bacon, tomato, black olives and cheese in bowl and toss to coat with dressing. Cover and chill at least 1 hour in the refrigerator. Toss with additional milk if the salad seems a little dry.

Birthdays

Hikmet Budak	1
Jessica Rupp	10
Heather Unverzagt	12
Robyn Klein	15
Chaofu Lu	16
Mareike Johnston	22
Faye Jorgensen	23
Deanna Nash	31

